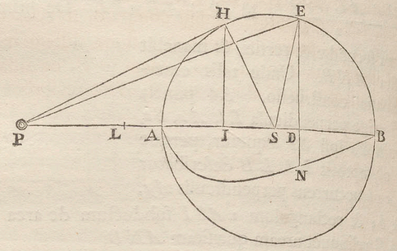
De Motu Corporum

Cujus tres partes ductæ in longitudinem AB, producunt areas totidem, *viz.* $\frac{2SIq \times SL}{\sqrt{2}SI}$ in $\frac{1}{\sqrt{LA}} - \frac{1}{\sqrt{LB}}$; $\frac{SIq}{\sqrt{2}SI}$ in $\sqrt{LB} - \sqrt{LA}$; & $\frac{SIq \times ALB}{3\sqrt{2}SI}$ in $\frac{1}{\sqrt{LA\,cub.}} - \frac{1}{\sqrt{LB\,cub.}}$. Et hæ post debitam reductionem fiunt $\frac{2SIq \times SL}{LI}$, SIq, & $SIq + \frac{2SI\,cub.}{3LI}$. Hæ vero,



subductis posterioribus de priore, evadunt $\frac{4SI\,cub.}{3LI}$. Proinde vis tota, qua corpusculum P in sphæræ centrum trahitur, est ut $\frac{SI\,cub.}{PI}$, id est, reciproce ut $PS\,cub. \times PI$. *Q. E. I.*

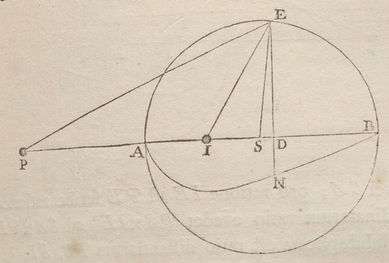
Eadem methodo determinari potest attractio corpusculi siti intra sphæram, sed expeditius per theorema sequens.

PROPOSITIO LXXXII. THEOREMA XLI.

In sphæra centro S *intervallo* SA *descripta, si capiantur* SI, SA, SP *continue proportionales: dico quod corpusculi intra sphæram, in loco quovis* I, *attractio est ad attractionem ipsius extra sphæram, in loco* P, *in ratione composita ex subduplicata ratione distantiarum a centro* IS, PS, *& subduplicata ratione virium centripetarum, in locis illis* P *&* I, *ad centrum tendentium.*

Ut,

Ut, si vires centripetæ particularum sphæræ sint reciproce ut distantiæ corpusculi a se attracti; vis, qua corpusculum situm in I trahitur a sphæra tota, erit ad vim, qua trahitur in P, in ratione composita ex subduplicata ratione distantiæ SI ad distantiam SP, & ratione subduplicata vis centripetæ in loco I, a particula aliqua in centro oriundæ, ad vim centripetam in loco P ab eadem in centro particula oriundam, id est, ratione subduplicata distantiarum SI, SP ad invicem reciproce. Hæ duæ rationes subduplicatæ componunt rationem æqualitatis, & propterea attractiones in I & P a sphæra tota factæ æquantur. Simili computo, si vires particularum sphæræ sunt reciproce in duplicata ratione distantiarum, colligetur quod attractio in I sit ad attractionem in P, ut distantia SP ad sphæræ semidiametrum SA. Si vires illæ sunt reciproce in tripli-



cata ratione distantiarum, attractiones in I & P erunt ad invicem ut $SP\,quad.$ ad $SA\,quad.$: Si in quadruplicata, ut $SP\,cub.$ ad $SA\,cub.$ Unde cum attractio in P, in hoc ultimo casu, inventa fuit reciproce ut $PS\,cub. \times PI$, attractio in I erit reciproce ut $SA\,cub. \times PI$, id est (ob datum $SA\,cub.$) reciproce ut PI. Et similis est progressus in infinitum. Theorema vero sic demonstratur.

Stantibus jam ante constructis, & existente corpusculo in loco quovis P, ordinatim applicata DN inventa fuit ut $\frac{DEq \times PS}{PE \times V}$. Ergo si agatur IE, ordinata illa pro alio quovis corpusculi loco I, mutatis mutandis, evadet ut $\frac{DEq \times IS}{IE \times V}$. Pone vires centripetas, e

sphæræ

ISAAC NEWTON *Philosophiæ Naturalis Principia Mathematica* LONDON, 1726 THE WARNOCK LIBRARY Octavo